Super Video for the XE Game Machine

By Mark Dusko

One day while organizing my Atari docs I noticed there was no video upgrade for the XEGM. At first I thought that perhaps Atari got the video circuits right in the last 8-bit computer, but then I bought one and turned it on. It had the same washed out fuzzy video all the other Xl and XE Computers have. There was only one thing to do, give the XEGM a super video upgrade, and while I was at it I also decided to add s-video support as well.

Much of this Upgrade is based on the work by Ben Poehand and Charles Cole of Atari Classics. There understanding of video circuits and Atari hardware must be commended and I give them credit for guiding me through the XEGM circuits. I also make a disclaimer here. I won't be responsible anyone destroying their beloved Atari game Machine or themselves while trying to do this upgrade. If you have never attempted this sort of upgrade or have limited knowledge of electronics, please get some help from someone who does. The upgrade is divided into 3 parts. Fixing the luminance circuit, the chrominance circuit, and adding s-video capabilities. All parts should be readily available from any electronic supply company. If you have trouble finding an s-video jack, I got mine from Action electronics. www.action-electronics.com. Now, enough of that stuff, let's get started

Start by removing the 5 screws from the bottom of the XEGM case. Separate the two halves and remove the RF shield. Remove the board and put the case aside for now. The first thing I noticed was that Atari used the same miss-configured luminance circuit as the other XL and XEs. So, just like the other Super Video upgrades:

1. _____replace C48 with a 220MFD radial type electrolytic capacitor. (Take note of the polarity before removing the old value)
2. _____replace R79 with a 2.2 ohm ¼ watt resistor
3. _____replace R78 with a 75 ohm ¼ watt resistor
4. _____add a 10MFD Tantalum capacitor to the tips of R78 and R79 with the positive side of the cap connected to R79 (see fig 1)

And now, it's on to the color circuit. Atari did something different here on the color side that the other Atari computers. They added an extra transistor amplifier before joining the luminance and chrominance together to form composite video. This should help balance the picture but they still had incorrect impedance for the color output, so the result was not much different than the other XE computers, but we can fix that. Also by lowering the value of R53, and increasing the value of C44, the video becomes much brighter and the color more rich:

1. _____replace R55 with a 6.8K ohm ¼ watt resistor
2. _____replace R54 with a 75 ohm ¼ watt resistor
3. _____Replace C44 with a 470 Pico farad ceramic capacitor
4. _____Replace R51 with a 75 ohm ¼ watt resistor
5. _____Replace R53 with a 22 ohm ¼ watt resistor

If you have no interest in adding an s-video jack to your XEGM, you are almost finished. Put the XEGM board back in its bottom case, hook the system up to power and a TV/monitor and put a cartridge in. Preferably Pole Position, Dig Dug or something with lots of colors. Next, carefully and slowly adjust the color potentiometer R38 with a small screw driver until the colors are accurate and to your liking. (See fig 4) This should only take a small adjustment. You should now have a bright, clear display with vibrant colors. You may also need to adjust your TV/monitor picture controls a bit too fine tune the picture. Enjoy. If you want to go further and have s-video then read on!

We are now going to add s-video output to our XEGM. If you look at fig2, you will see the pin out for the s-video jack. This is the female Jack and this is the view from the front of the connector. First, find a suitable place to mount the s-video jack. Drill the holes and mount the jack (See fig 5.) Now that you know it fits, remove it from the case. What we are going to do is solder pins 1 and 2 together and connect that to ground on the XEGM board. I soldered two small pieces of bare wire on the pins, twisted them together to make a pony tail and then soldered a 2.5 inch black wire to the pony tail and connected the other end to a spot on the board between transistors Q4 and Q5. (See fig 3) Next we need to connect the luminance and chrominance signals to our s-video jack. In order to do this we need to add two 75 ohm ¼ watt resistors, one to pin 3 (Luminance) and one to pin4 (chrominance) of the s-video jack. The other end of the resistors will connect to the signals from the XEGM board. Cut the leads on the resistors to just about ½ inch and soldered one end to the s-video connector and the other to a 2.5 inch piece of wire. I used different color wire to distinguish the two signals. I also slipped a piece of heat shrink tubing over the resistors for a clean look and protection against any possible shorting. Next we can solder the luminance wire to the base of transistor Q4. (See fig 3) Be careful not to apply heat too long or you could burn out the transistor. Finally, solder the chrominance wire to left side of R54 which we changed earlier to a 75 ohm resistor. (See fig 3.)

We are almost finished. Put the XEGM board back in its bottom case. Remount the s-video jack into the XEGM case and tighten the mounting screws. Hook the system up to power and an s-video TV/monitor and put a cartridge in. Preferably Pole Position, Dig Dug or something with lots of colors. Next, carefully and slowly adjust the color potentiometer R38 with a small screw driver until the colors are accurate and to your liking. (See fig 4) This should only take a

small adjustment. You should now have a bright, clear display with vibrant colors. You may also need to adjust your TV/monitor picture controls a bit too fine tune the picture.

Some final notes on this upgrade; Using s-video instead of composite will affect any software that uses artifacting. However, the composite output is still intact and can be used any time if artifacting is needed. Personally, I use the s-video display for data entry and word processing and composite for most game playing. Also if you are familiar with Ben Poehland's Super video 2.1XL upgrade you will notice that he adds a switch for chroma/luma and composite output. This is to make sure there is no synch pulse bleeding into the color output which can make the video output slightly grainy. I didn't see that phenomenon happen on the 2 different monitors and 3 different TVs I tried this upgrade on, so I didn't put that into this mod. If anyone wants to install a switch for such a reason that can be easily accomplished by lifting up the right side of R53 and attaching a SPST switch between the end you just pulled up and the now empty hole on the XEGM board.

I hope this mod is useful to the Atari community. It is free to distribute anywhere. If anyone has any suggestions or comments please feel free to contact me.
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Parts List

220 Microfarad axel electrolytic capacitor 16V or greator
10 Microfarad tantalum capacitor 16V or greator
470 Picofarad ceramic capacitor
5 each 75 ohm ¼ watt resistors (only 3 are needed if s-video jack is not used
2.2 ohm ¼ watt resistor
22 ohm ¼ watt resistor
6.8k ohm ¼ watt resistor
Panel mount S-video jack
3 each 2.5 inch pieces of different color wire
3 each 2 inch pieces of heat shrink tubing

Tools needed

Low wattage Soldering iron
Desoldering iron
Small needle nose pliers and wire cutters
Drill and drill bits to mount s-video connector

Diagrams

Fig1. Notice the yellow tantalum cap soldered between R78 and R79. R79 is the positive side of cap. R78 is the resistor closest to transistor Q3
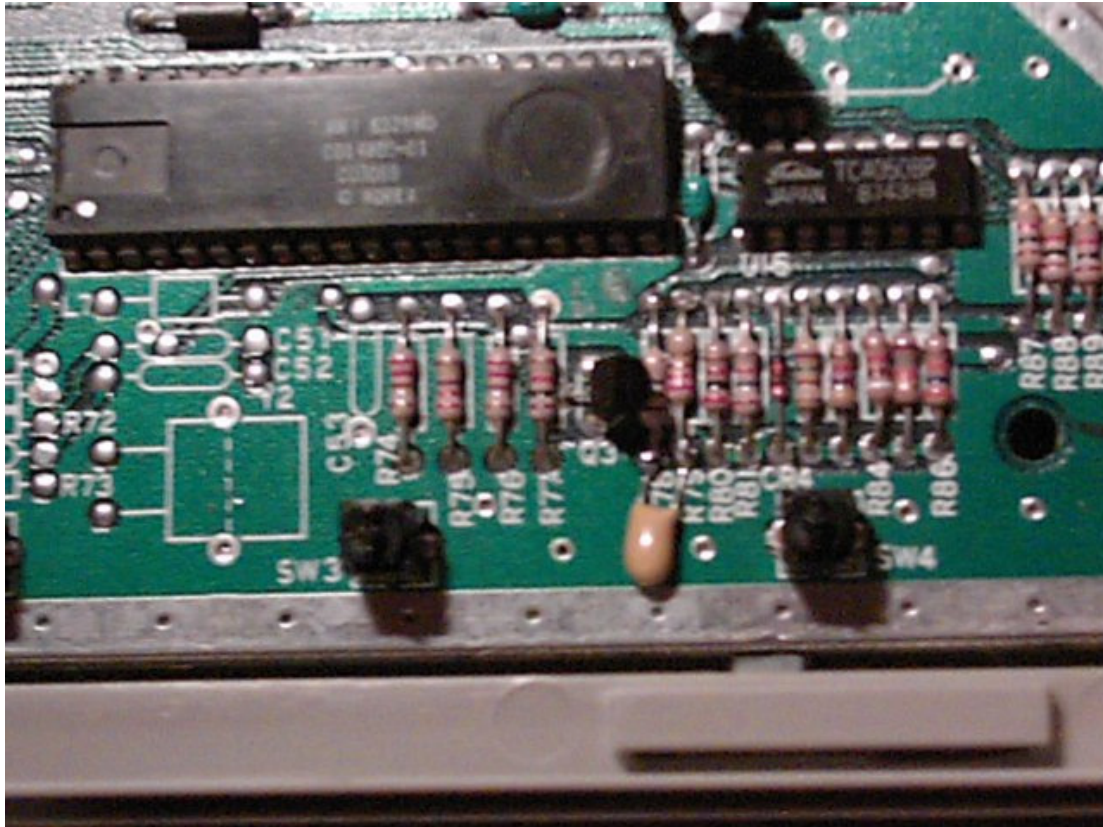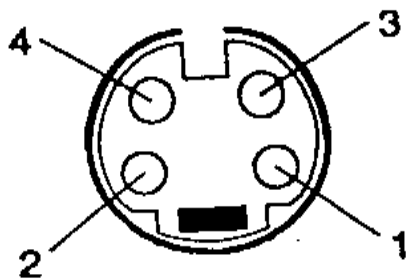

Fig2. Pin out of S-video Connector (front view of female connector)

4 C (chrominance)   3 Y (luminance+synch)

2 C Ground   1 Y Ground

Fig3. Here is a view of where to pickup the s-video signals. White is Luma, Blue is Chroma, and black is the ground connection. Also, the resistors are soldered to the s-video jack and covered by heat shrink tubing.
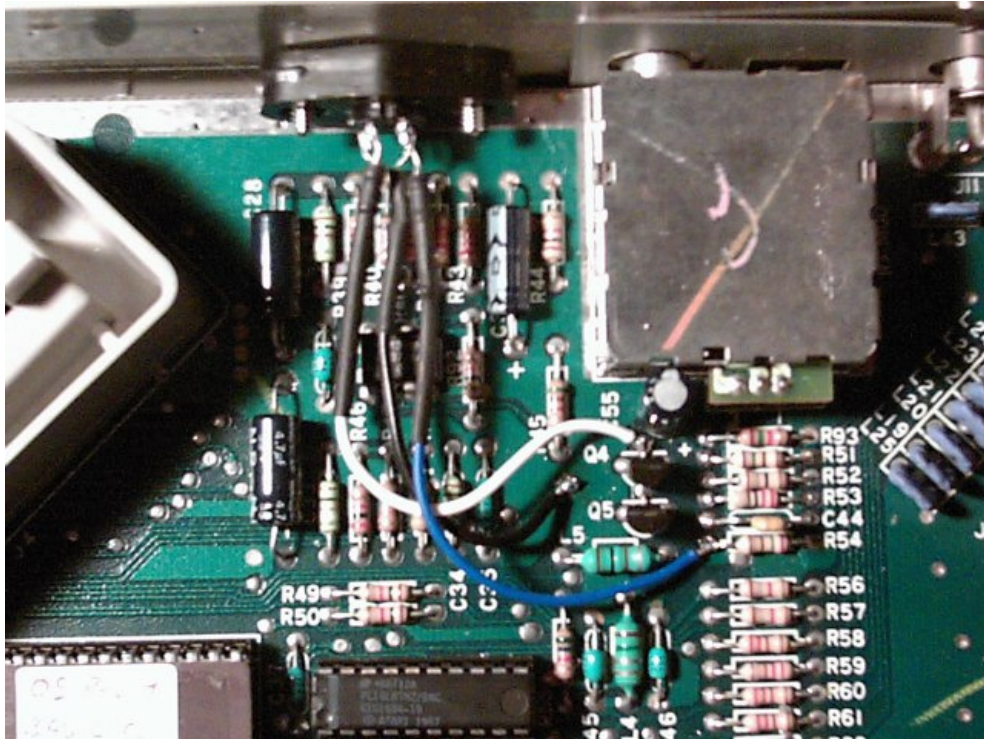

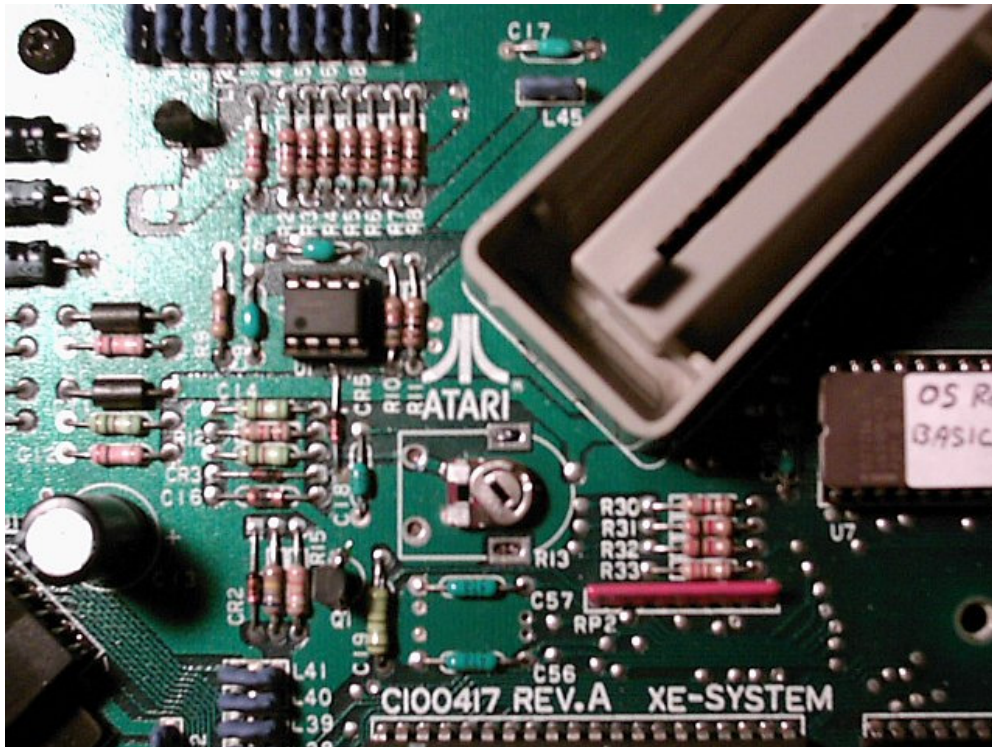Fig4. The color adjust pot is in the middle of the picture just below the Atari logo.

Fig5. Here is a view of the back of the XEGM with the S-video jack visible.